

Virginia City Hybrid Energy Center
Response to Data Request
Vivian Thomson, Vice Chair, Virginia Air Pollution Control Board

Question (Page No. 5):

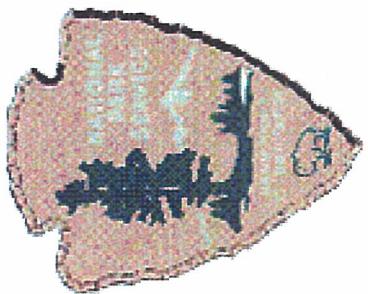
The visibility analysis used was based on Method 8. However, this method has not been approved by the National Park Service.

Response:

John Notar of the National Park Service pointed out in a presentation to the EPA State Modeler's Workshop on May 16, 2007 entitled, "Federal Land Managers' Activities and Issues" (Attachment 1) that the FLAG guidance of 2000 was intended to be a working document with revisions and refinements made to the techniques over time. As a result of several factors, including regulatory developments such as the BART rule and input from applicants and regulatory authorities, revisions to the FLAG procedures have been accepted by the Federal Land Managers (FLMs) as a matter of practice in individual applications. In his presentation Notar listed modified and refined visibility procedures that are currently considered by the FLMs. These include (1) the use of Method 6 instead of Method 2, (2) use of the 98th percentile visibility impact value as recommended by the USEPA for BART, and (3) use of the new IMPROVE extinction equations which are included in Method 8. The CALPOST Method 8 was shown to be equivalent with the spreadsheet technique already accepted by the FLMs and USEPA.

ATTACHMENT 1

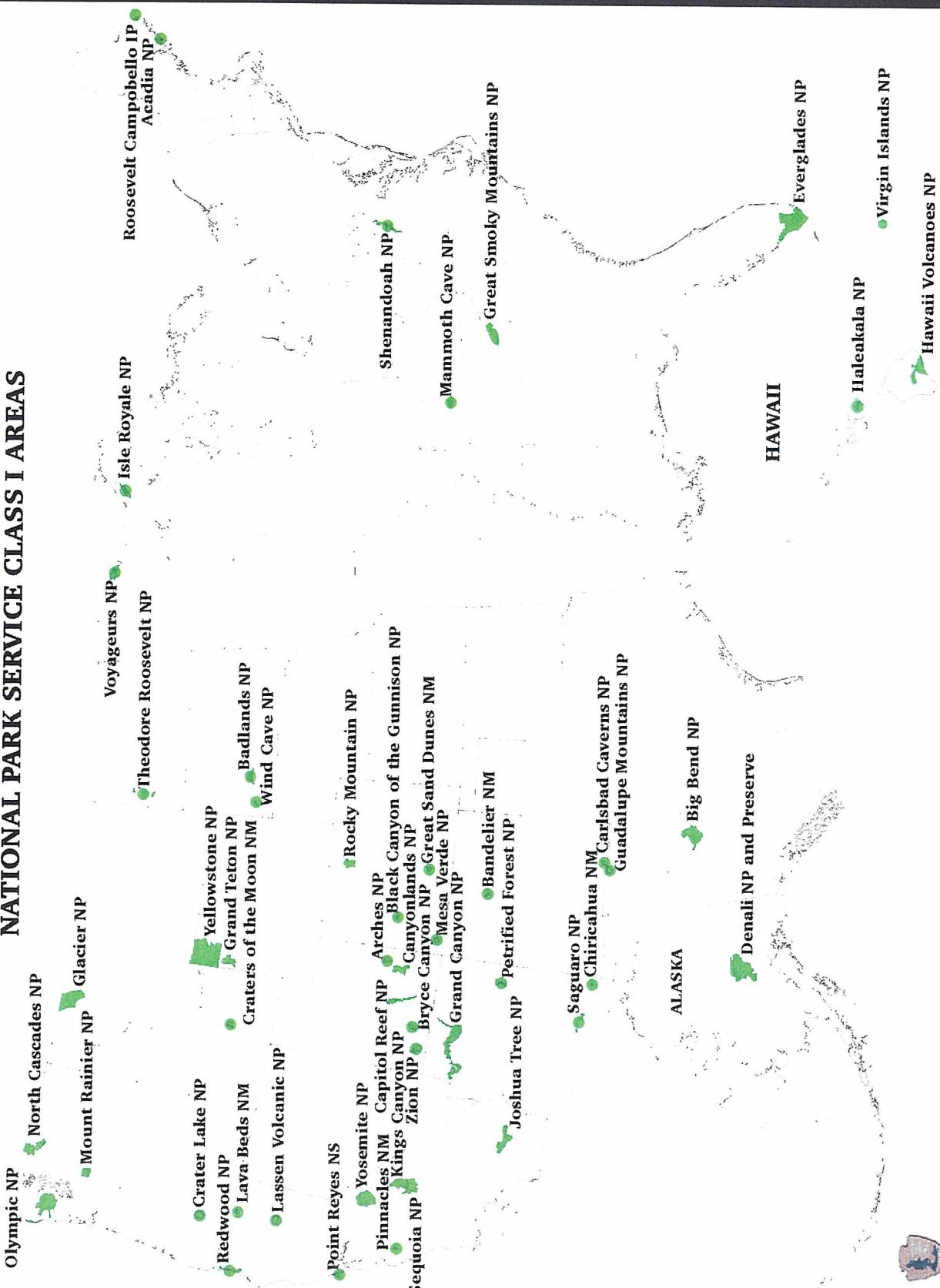
FEDERAL LAND MANAGERS' Activities and
Issues
EPA Regional State Modelers Workshop
May 16, 2007



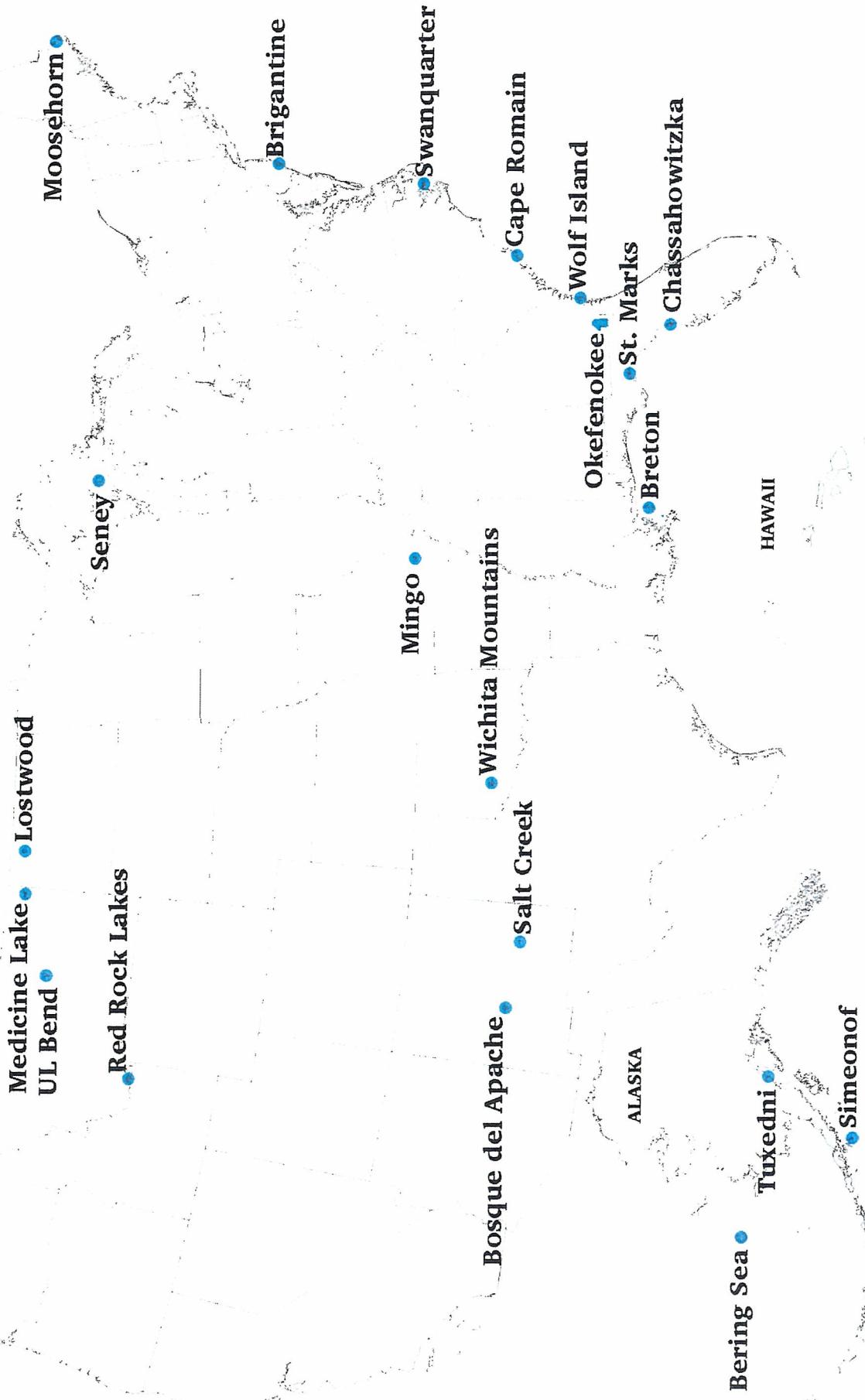
Disclaimer

- The following presentation represents the current views and ideas of the federal land management agencies' staff and does not necessarily represent the official position of the Department of the Interior, the Department of Agriculture, or the agencies or bureaus of these departments.
- Editorial comments are those of the presenter and do not necessarily reflect the views or opinions of anyone else.

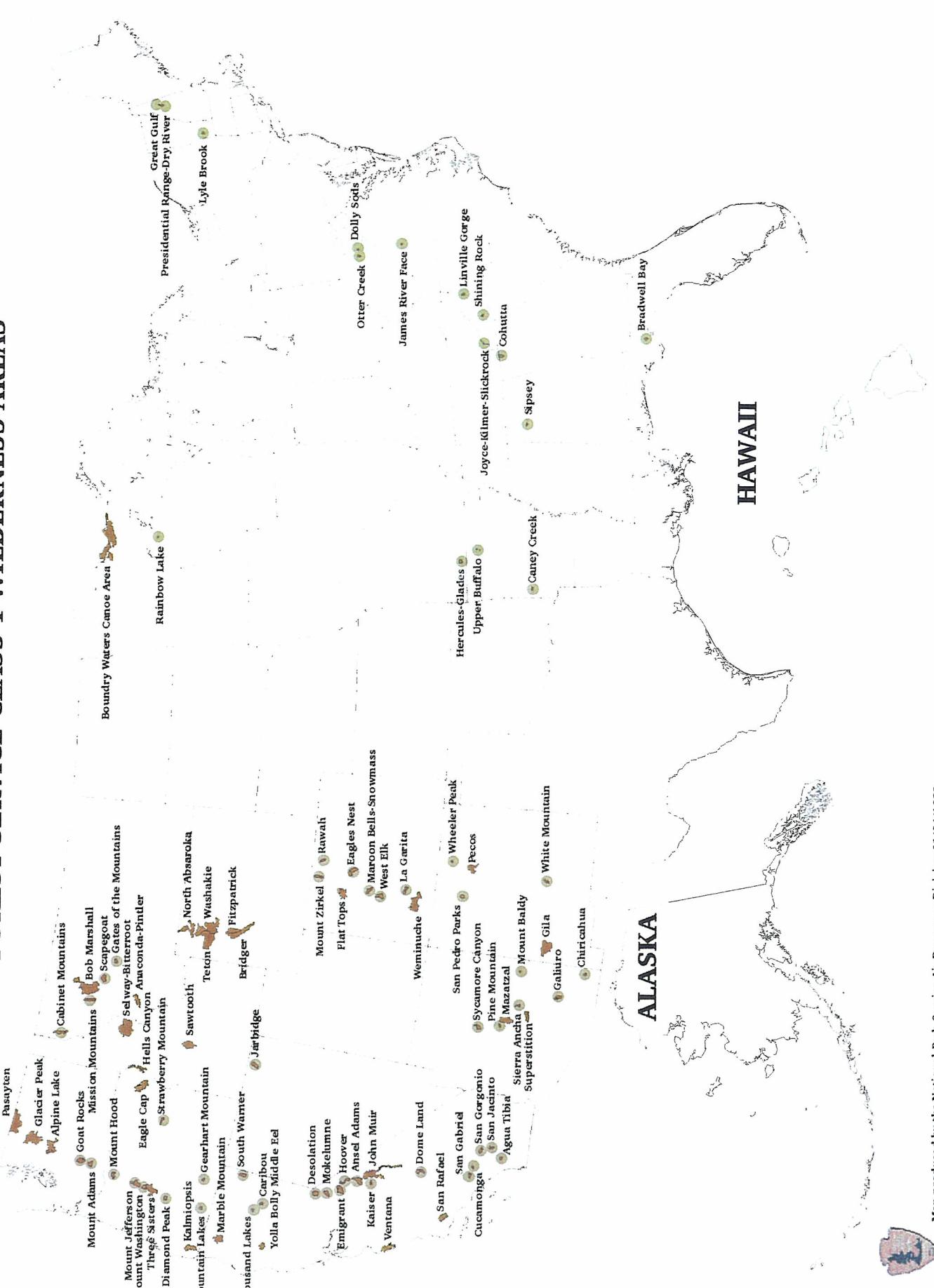
NATIONAL PARK SERVICE CLASS I AREAS



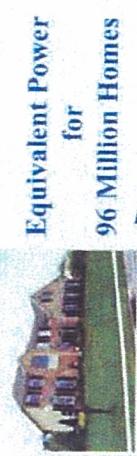
FISH AND WILDLIFE SERVICE CLASS I AREAS



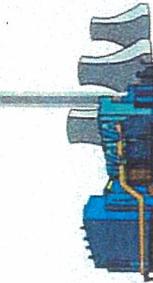
FOREST SERVICE CLASS 1 WILDERNESS AREAS



Coal's Resurgence in Electric Power Generation

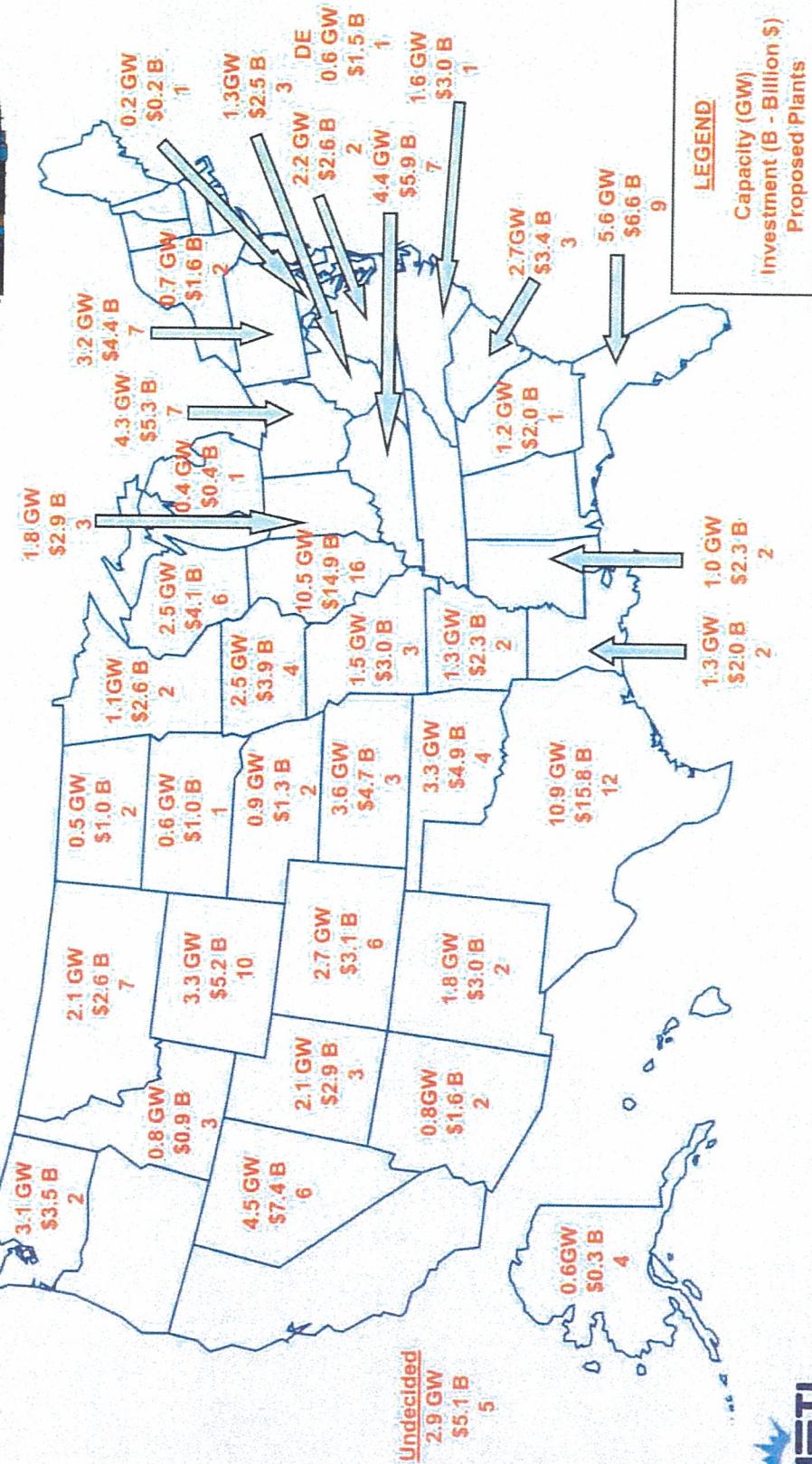


Equivalent Power
for
96 Million Homes



Proposed New Plants

159 Plants
96GW
\$ 141 Billion



LEGEND
Capacity (GW)
Investment (B - Billion \$)
Proposed Plants

NETL Contacts: Scott Klara, klara@netl.doe.gov

OCES 1/24/2007



NPS / FWS / USFS PERMIT ACTIVITIES

- Previous slide shows 150 coal fired power plants on the drawing boards to be built by 2030.(DOE)
- NPS has 62 power plant permits in house at various stages. (most are coal fired)
- FWS has 14 power plant permits in house at various stages.
- Only 6 are IGCC plants
- For PSD permits FLMs ONLY accepting the EPA Guideline version 5.711a SUITE of the CALPUFF system (CALMET = 5.53a

FLAG 2000

- A screening tool to assess potential impacts on AQRVS
- Provides certainty (i.e., “bright lines”) for those sources with impacts **BELOW** established significant impact levels (i.e., no adverse impact)
- Does not establish “bright lines” for adverse impact decisions
- Maintains and recognizes the role of the “FLM” in making project-specific adverse impact decisions

Reasons for Revisions

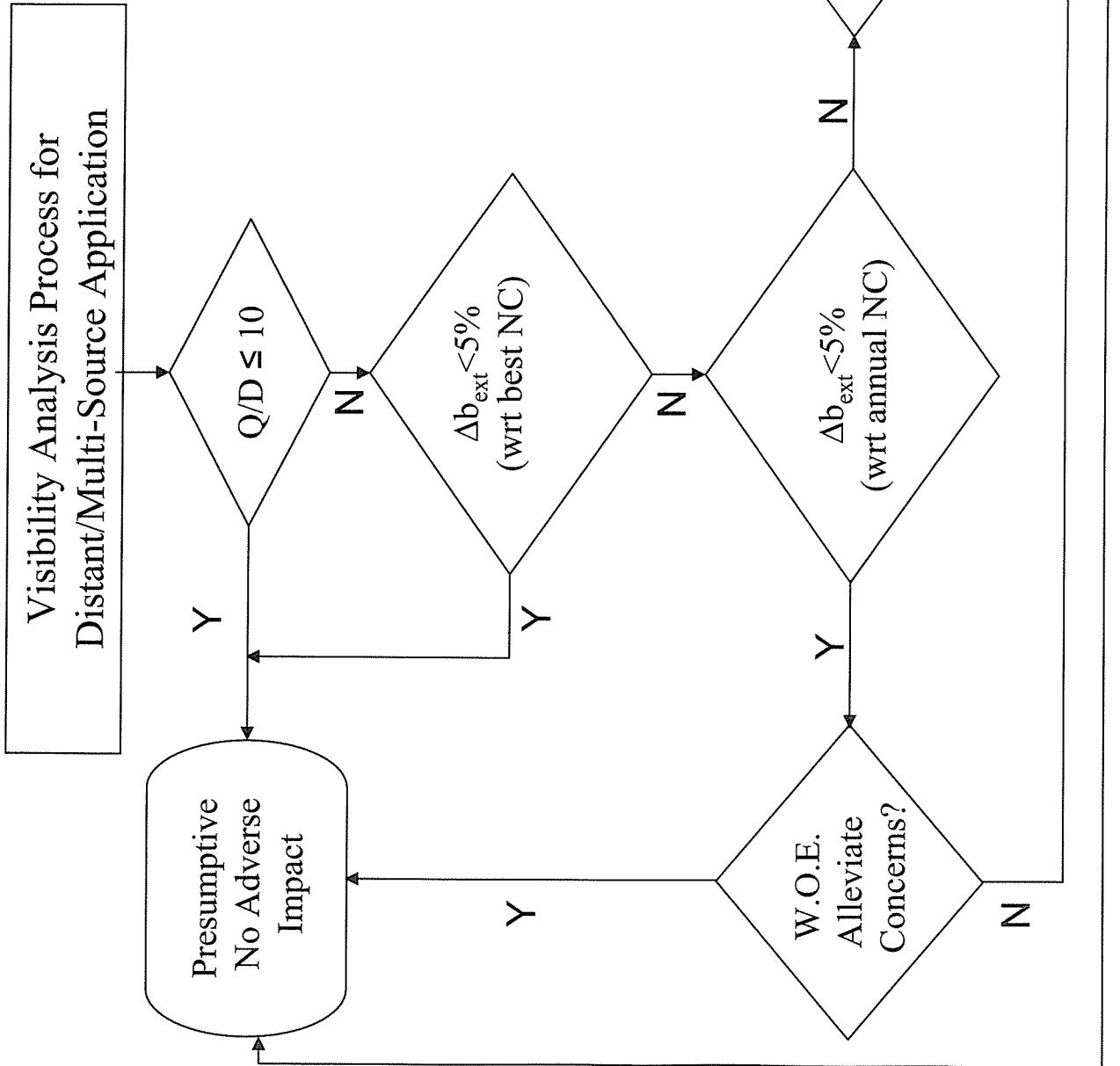
- FLAG 2000—A useful tool; intended to be a working document and revised as necessary
- FLMs have gained knowledge on how to better assess impacts on AQRVs
- New regulatory developments over past seven years (e.g., BART rule)
- Input from applicants and permitting authorities suggest both technical and policy changes are warranted
- Not a “comprehensive” revision, but instead we focus on the visibility analysis, the deposition levels, and the factors FLMs will consider in their decision-making process.

Existing FLAG Haze-like Analysis

- Run CALPUFF (3 years of met. data)
- Concentrations of SO_4 ; NO_3 ; PMF; PMC; EC; OC
- Calculate a visibility index – b_{ext}
 - 24-hour average
 - Hour-by-hour b_{ext} using hourly $f(\text{RH})$ concentration (95% rollback)
- Compare change in b_{ext} against annual average natural conditions
- Use maximum modeled values

Potential FLAG Visibility Changes

- Use monthly average $f(RH)$ (MVISBK=6)
- 98th percentile 5% Δb_{ext} (i.e. 8th high)
 - Any 1 year fails test
- Two tiered test
 - First against 20% best natural conditions
 - Second against annual average natural conditions
- If fail test look at context and mitigation, then refined analysis (if necessary)
- Adverse impact determination process more explicit; considers regulatory and contextual factors



IMPROVE Algorithms

- FLAG 2000

$$\begin{aligned} - b_{ext} = & 3f(RH)[sulfates] + 3f(RH)[nitrates] \\ & + 4[organics] + 10[elemental carbon] \\ & + 1[fine soil] + 0.6[coarse matter] + 10 \end{aligned}$$

- New (changes in blue)

$$\begin{aligned} - b_{ext} = & 2.2f_S(RH)[small sulfates] + 4.8f_L(RH)[large \\ & sulfates] + 2.4f_S(RH)[small nitrates] + \\ & 5.1f_L(RH)[large nitrates] \\ & + 2.8[small organics] + 6.1[large organics] \\ & + 10[elemental carbon] + 1[fine soil] \\ & + 1.7f_{SS}(RH)[sea salt] + 0.6[coarse matter] \\ & + Rayleigh scattering (site specific) \\ & + 0.33[NO_2(ppb)] \end{aligned}$$

Extinction Efficiency (1/Mm per ug/m**3)

MODELED particulate species:

PM COARSE (EEPNC) -- Default: 0.6 ! EEPNC = 0.6 !

PM FINE (EPMF) -- Default: 1.0 ! EPMF = 1.0 !

BACKGROUND particulate species:

PM COARSE (EPMCBK) -- Default: 0.6 ! EPMCBK = 0.6 !

Other species:

LARGE AMMONIUM SULFATE (EESO4) -- Default: 4.8 ! EESO4 = 4.8 !

SMALL AMMONIUM SULFATE (EESO4) -- Default: 2.2 ! EESO4 = 2.2 !

LARGE AMMONIUM NITRATE (EENO3) -- Default: 5.1 ! EENO3 = 5.1 !

SMALL AMMONIUM NITRATE (EENO3) -- Default: 2.4 ! EENO3 = 2.4 !

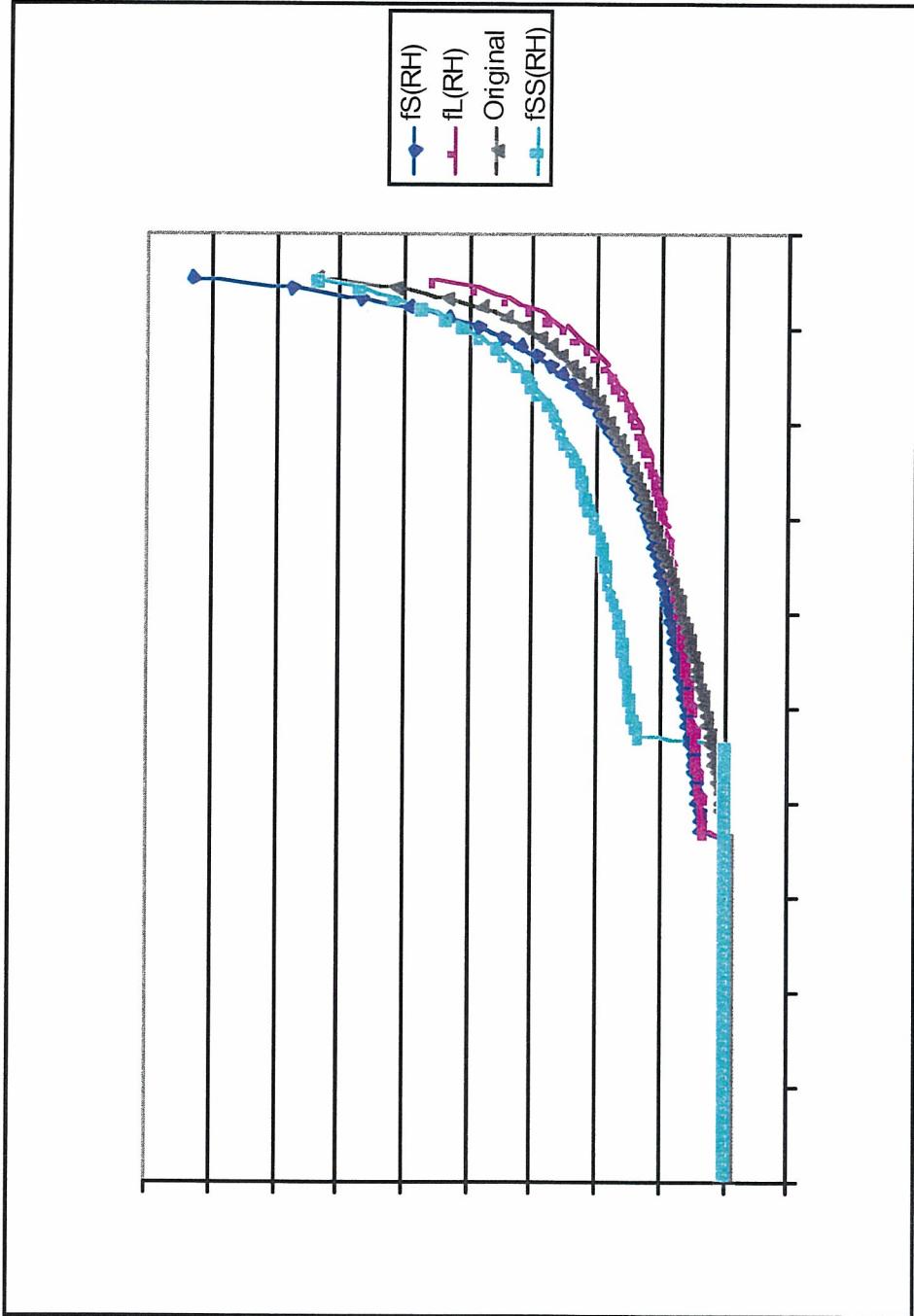
LARGE ORGANIC CARBON (EEOC) -- Default: 6.1 ! EEOC = 6.1 !

SMALL ORGANIC CARBON (EEOC) -- Default: 2.8 ! EEOC = 2.8 !

SOIL (EESOIL)-- Default: 1.0 ! EESOIL = 1.0 !

ELEMENTAL CARBON (EEEC) -- Default: 10. ! EEEC = 10.0 !

$f(RH)$ Curves



Auxiliary Formulas for Applying New IMPROVE Algorithm

- Could use the VISTAS spread sheet to apply new IMPROVE algorithm
- VISTAS spread sheet has been reviewed by EPA and the FLMs
- Presently the FLMs DO NOT accept the “CALPOST Method 8”
 - “CALPOST METHOD 8” has not yet been reviewed

ADVERSE IMPACT

An unacceptable effect, as identified by an FLM, that results from current, or would result from predicted, deterioration of air quality in a Federal Class I area. A determination of unacceptable effect shall be made on a case-by-case basis for each area taking into account existing air quality conditions. It should be based on a demonstration that the current or predicted deterioration of air quality will cause or contribute to a diminishment of the area's national significance, impairment of the structure and functioning of the area's ecosystem, or impairment of the quality of the visitor experience in the area.

FLM Adverse Impact Determination

- Made on a project-specific basis
- Based on air quality impact modeling performed by the applicant and verified by the FLM
- Considers magnitude, frequency, duration, location, geographic extent, timing of expected impacts (and other factors)

What Does “Weight of Evidence” (W.O.E.) Mean?

- If here you have failed the 20% best natural condition test, but passed the annual natural condition test
- If BACT in question, or multiple Class I areas impacted, or if State using 20% best background in its BART analysis, may jump to context, mitigation, further analysis
- In many cases, with resolution of BACT, probably pass without further analysis

Further Considerations

- Regulatory Factors
 - Geographic extent, intensity, duration, frequency, time of visitor use, natural conditions that affect visibility
- Contextual Considerations
 - Current pollutant concentrations and AQRV impacts in the Class I area
 - Air Quality trends in the Class I area
 - Emission offsets obtained or other mitigation offered by the permit applicant
 - Enforceable emission changes that have occurred or would occur before source operation date
 - Whether there are approved SIPs that account for new source growth and demonstrate “reasonable progress” toward visibility goals
 - Expected life of the source
 - Stringency of proposed emission limits (BACT?)
 - Ancillary environmental benefits proposed by applicant (e.g., reduced toxics emissions, pollution prevention investments, CO₂ sequestration, purchase of “green” power)
 - Comments from the public and other agencies

Further Considerations (cont)

- Mitigation strategies
 - Emission offsets
 - Emission rate reductions
 - Monitoring/special studies leading to future permit revision (**monitoring alone NOT a mitigation strategy**)
- Results of refined analysis (if necessary)
 - Refined analysis could be hour by hour

Deposition Analysis

- Included concern thresholds, pollutant exposures, and deposition analysis thresholds (DATs) for sulfur and nitrogen deposition
 - EAST-Total Sulfur; Total Nitrogen=0.01 Kg/HA/Yr
 - WEST-Total Sulfur; Total Nitrogen=0.005 Kg/HA/Yr
- Expanded discussion of “Critical Loads” to reflect developments since FLAG 2000
- Replaced dated deposition maps with reference to NADP website for current trends data
- Replaced old deposition data with links to agency websites

Ozone Analysis

- Updated ozone sensitive species lists, but replaced the lists with links to agency websites to help keep info more current
- Deleted old/outdated ozone effects data

FLAG INFORMATION/QUESTIONS?

- Contact: Tim Allen (FWS)

– Tim_Allen@fws.gov

– (303) 914-3802

- Contact: John Notar

John_Notor@nps.gov

(303) 969-2079

- Websites:

<http://www2.nature.nps.gov/air/permits/flag/index.cfm>

<http://www.nature.nps.gov/air>

<http://www.fws.gov/refuges/habitats/airQuality.html>

<http://fs.fed.us/air>